

## A GeBPSG TOP CLAD FOR A PLANAR LIGHTWAVE CIRCUIT

### ABSTRACT OF THE DISCLOSURE

5 A method of depositing a top clad layer for an optical waveguide of a  
planar lightwave circuit. A GeBPSG top clad layer for an optical waveguide  
structure of a planar lightwave circuit is fabricated such that the top clad  
layer comprises doped silica glass, wherein the dopant includes Ge  
(Germanium), P (Phosphorus), and B (Boron). In depositing a top clad layer for  
the optical waveguide, three separate doping gasses (e.g.,  $\text{GeH}_4$ ,  $\text{PH}_3$ , and  
10  $\text{B}_2\text{H}_6$ ) are added during the PECVD (plasma enhanced chemical vapor  
deposition) process to make Ge, P and B doped silica glass (GeBPSG). The  
ratio of the Ge, P, and B dopants is configured to reduce the formation of  
crystallization areas within the top clad layer and maintain a constant  
refractive index within the top clad layer across an anneal temperature range.  
15 A thermal anneal process for the top clad layer can be a temperature within a  
range of 950C to 1050C. The GeBPSG top clad layer reduces the insertion loss  
of passive arrayed waveguide grating devices and active planar lightwave  
circuit devices.